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The Organization of Concrete Concepts

Jingyi Geng[a,*], Tao Wei[a], Tatiana Schnur[a]

[a] *Rice University*

Introduction

How is knowledge about concepts organized? Crutch and Warrington (2005) propose that concrete concepts are organized by the degree of overlap in semantic features between concepts (category, e.g., *mouse* and *rabbit*). In contrast, Hamilton and Coslett (2008) suggest that concrete concepts are organized by both category and association where association refers to the links between concepts that tend to co-occur in language (e.g., *mouse* and *cheese*). Here, we describe a double dissociation in the recognition of category and association relationships for concrete concepts in speakers with chronic aphasia.

Methods

We tested eight left hemisphere stroke speakers with aphasia (age range 42-84 yrs) and eight controls (age range 59-84 yrs) on a word-picture verification task. Speakers with aphasia were selected if their performance was outside the range of controls on at least one of the following semantic tests: synonymy triplets, word-picture verification, or the Pyramid and Palm Trees test. Word targets (n=51) were paired with pictures across four conditions: identical, categorically related, associatively related, and unrelated. Participants concurrently heard a word and saw a picture. Participants pressed "yes" or "no" to indicate whether the word was the picture name.

Results

We compared error rates in the categorically and associatively related conditions in comparison to a baseline unrelated condition. To control for the possibility of Type I error as a result of multiple comparisons, we used significance thresholds determined by False Discovery Rate (FDR) correction (Shaffer, 1995). BQ showed significantly more errors in the categorically than associatively related condition whereas NK and CV showed the reverse pattern (see Figure 1). Performance on the unrelated condition was significantly better, demonstrating performance in the categorically/associatively related conditions was not simply due to a failure to understand the task. Other patients did not show error differences between the two semantically related conditions.

Conclusion

That recognition of categorical and associative relationships is differentially impaired in patients suggests that these relationships are equally important for the organization of concrete concepts, consistent with a previous neuropsychological study (Hamilton & Coslett, 2008). We are currently exploring the nature of the deficit that produces these impairments, and whether abstract concepts are similarly organized.

* Corresponding author.
E-mail address: jg21@rice.edu .

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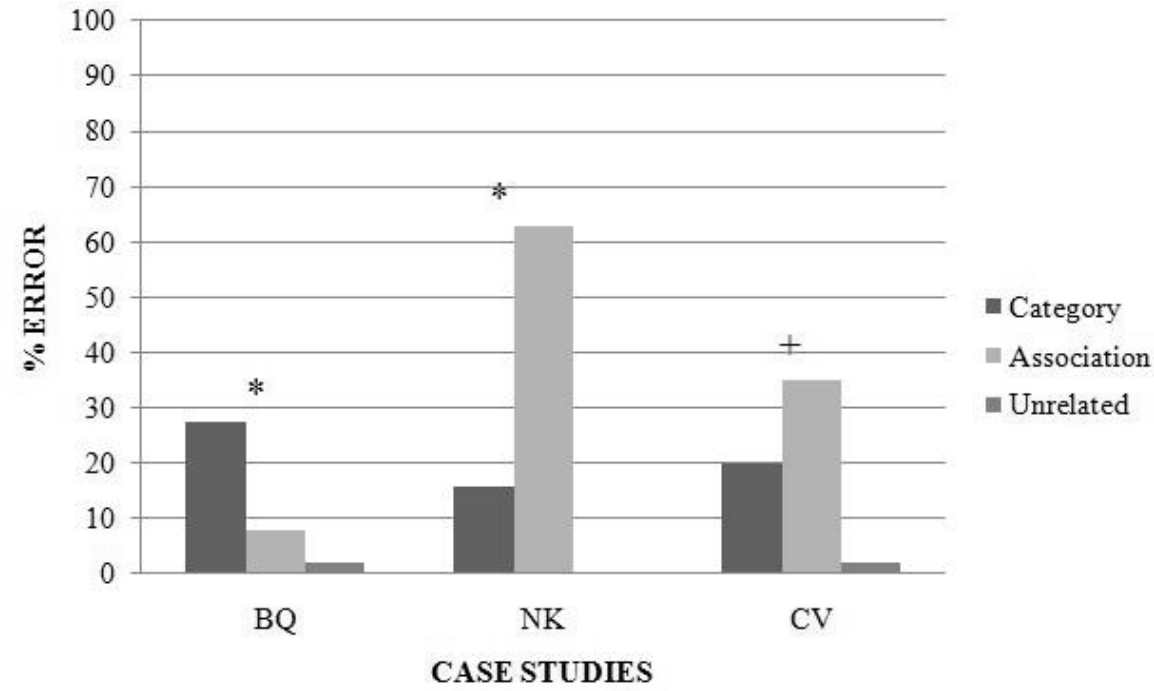

Figure 1. Error rates for BQ, NK and CV in categorically related, associatively related, and unrelated conditions (* $p < .01$; + $p < .08$).

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